Order Spirobolida

Trigoniulus laminifer docens Wang 1950

1 male, taken at Mt. Maquiling, Laguna Province, Luzon, El. 1500–3200, Nov. 21, 1945.

Spirostrophus socius socius Chamberlin 1921

1 female each taken at Mt. Maquiling, Laguna Province, Luzon, El. 800–3000, Nov. 18, 1945, and at Dolores, Tayabas Province, Luzon, El. 1200, Nov. 13, 1945.

Spirostrophus socius mindanaunus Wang 1950

1 male taken at Mt. Maquiling, Laguna Province, Luzon, El. 600–1200, Oct. 13, 1945.

Spirostrophus socius sumarinus Wang 1950

2 females taken at Los Banos, Laguna Province, Luzon, Oct. 30, 1945.

Improved Technique for Rearing Chigger Mites [1, 2] (Acarina: Trombiculidae)

By Louis J. Lipovsky

A culture tube and a dish for rearing chiggers have been used successfully for the past four years. The tube and dish are used without any material other than a mixture of charcoal and plaster of Paris which line the tube and dish. The tube is used primarily for engorged larvae held for transformation into nymphs; however, rearing may be continued through the adult stage using the 3- or 5-dram vial described below. The culture dish is especially useful and convenient for observations and ease of manipulation of the post-larval stages.

[1] The studies upon which this paper is based were conducted under contract, N6 ori 220 Task Order II, between the University of Kansas and the Office of Naval Research.

[2] Contribution number 792 from the Department of Entomology, University of Kansas.

The culture tube is a modification of the tube described by Farrell and Wharton (1948, Jour. Parasit. 34: 71) for shipping larval trombiculids; however, it is made with a 3- or 5-dram, Kimble "Opticlear," plastic-stoppered vial instead of a cork-stoppered shell vial. This plastic-stoppered vial is suitable for shipping all stages of chiggers as well as the collembloans which are cultured as food for the nymphs and adults (Lipovsky, 1951, Jour. Parasit. 37: 324–326).

The vial, 3- or 5-dram, is lined completely with a charcoal and plaster of Paris mixture. This mixture is prepared as follows: mix 600 c.c. of dry, slow-setting (common) plaster of Paris with 50 c.c. of powdered charcoal; blend thoroughly by shaking in a capped jar. This amount of plaster mixture will be sufficient for many vials. The same mixture is used to make the culture dish.

Seven cubic centimeters (slightly compacted) of this dry mixture is placed in the 3-dram vial and to this 3 c.c. of water are added and mixed until plastic but not fluid; if it flows add a little more dry mixture. Then the plastic stopper is placed tightly in the vial, and, holding the inverted vial between thumb and forefinger, the stoppered end is tapped sharply 6 to 8 times on a flat, solid, wooden surface. Turned upright again, the vial is tapped 3 to 4 times (relax hold on vial during moment of impact to avoid injury if vial should break).

At this point the top and sides of the vial should be lined with a thin, uniform coat and the bottom of the vial should contain about 15 mm. of wet plaster. After the plaster has set, the stopper is slowly removed. The plaster lined vial should have a thin seal at the opening of the tube, just beneath the bottom level of the plastic stopper. This seal is removed carefully and then discarded. For the admission of light within the tube, 4 or 5 longitudinal slits are made in the plaster on the sides of the tube. The culture tube is now ready for use.

Stoppered tubes will maintain a uniform humidity for many months and no water need be added when chiggers are first placed in the tubes. When these tubes are used for shipping, 3 or 4 pin holes should be made in the bottom portion of the

stopper; and if the top of the cap is also solid, pin holes should be made here also to compensate for the changes in temperatures and pressures encountered during shipment. If a tube is opened frequently for observations, a few drops of water may be added as needed but care should be taken to avoid adding water in excess of that absorbed by the plaster.

The dish is a stender dish with an inside diameter of 65 mm. and 20 mm. in depth. It is lined inside with the same plaster mixture used in making the culture tube. The wet mixture is blended and shaped against the sides of the dish up to the top edge, then the bottom of the dish is tapped until the mixture forms a level bottom with a thin plaster lining on the sides. When set, the plaster should be smooth, free of pits and cavities. The upper 6 mm. of plaster lining should be removed to form a plaster-free zone. This plaster-free band must be kept clean and smooth to act as a barrier to the nymphs and adults.

Coating the outside of the dish and the entire lid with paraffin as well as covering the lid with waxed paped is recommended. As the paraffin solidifies on the lid, the dish and lid are fitted together tightly. The lid is then covered with a sheet of thin waxed paper by placing the waxed paper over the open dish, pressing the lid snugly to the dish, lifting the edges of the paper over the top of the lid and fusing it to the paraffin coating with a hot spatula. The inner central portion of the paper should remain free, leaving a space between the waxed paper and the lid.

Farrell and Wharton (1949, Jour. Parasit. 35: 435) recommend the use of vermiculite, a mica, as a "substrate" over a charcoal-plaster mixture. Hyland (1951, Ann. Ent. Soc. Amer. 44: 297–301) reported on the use of a small stender dish as a microculture dish, with the charcoal-plaster mixture covered with a thin layer of sterilized soil. The writer has found that two grooves cut into the plaster surface about 2 mm. in depth and 2 mm. wide, in the form of a cross, and centrally located, is all that is needed. These straight grooves provide a protective niche into which nymphal and adult chiggers may crawl, where they may transform and yet be visible under the microscope. In dishes which contain both collembolans and chiggers for periods

of weeks or months, the grooves become filled with eggs, exuviae, and some debris under which chiggers may conceal themselves. These grooves, therefore, should be cleaned out periodically to avoid possible injury to specimens when trying to locate them.

This culture dish is ideal for individual rearing of chiggers or for as many as 50 adults of the same species. In the latter instance, food must be available at all times or they may eat their own eggs for they are cannibalistic. Their own eggs are frequently eaten even when other food is available.

In addition, this culture dish has been used successfully for rearing other small arthropods including mites of the families Oribatidae, Tyroglyphidae, Trombidiidae, Phytoseiidae, Macrochelidae, Anoetidae, Uropodidae, and Cheyletidae as well as insects of the families Cryptostemmatidae (Hemiptera), Staphylinidae and other coleopterous species, and Stratiomyiidae, Sciaridae, Mycetophylidae and other Diptera.

Catches of Euplexoptera and Elateridae in Light Traps in South Dakota

By H. C. Severin, South Dakota State College

Light traps have been operated in representative areas in South Dakota for many years and during this time much valuable information concerning insects has been accumulated. In this article, catches dealing only with Euplexoptera and Elateridae will be discussed.

The earwig, *Labia minor* (L.) is the only species of Euplexoptera that can be reported as occurring in South Dakota at the present time. This earwig is not common in South Dakota and strange to say we have been able to collect it only through light traps or from illuminated show windows of store buildings in southeastern South Dakota. Diligent search has been made for this species of earwig in what should have been very favorable environments, but we have not been able to collect a single